

MAR 10 2009

PATENT APPLN. NO. 10/600,571
RESPONSE UNDER 37 C.F.R. §1.111

PATENT
NON-FINAL

IN THE CLAIMS:

1 - 16. (canceled)

17. (currently amended) A process for purifying exhaust gas from a gasoline engine of a fuel-direct-injection type using an exhaust gas ~~purifying-use~~ purifying catalyst containing a noble metal and a transition metal and which removes hydrocarbons, carbon monoxide and nitrogen oxides from the exhaust gas, comprising providing the gasoline engine of the fuel-direct-injection type;

directly injecting gasoline into a cylinder of the gasoline engine of a fuel-direct-injection type to provide a mixture of air and gasoline having an air-fuel ratio of 13 to 15 and combusting the mixture to form an exhaust gas in a first exhaust gas state having an exhaust-gas temperature in a range of 350°C to 800°C at an inlet to the catalyst;

the catalyst being obtained by mixing the noble metal and the transition metal with or carrying the noble metal and the transition metal by a fire-resistant inorganic oxide having a BET surface area of 50 m²/g to 200 m²/g and having a pore diameter of 10 nm to 30 nm, an amount of the noble metal being in a range of 0.01 g/liter to 50 g/liter with respect to catalyst volume, the

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fire-resistant inorganic oxide being α -alumina, active alumina, titania, zirconia, or a composite oxide of α -alumina, active alumina, titania, and zirconia,

contacting the exhaust gas in the first exhaust gas state with the catalyst to remove hydrocarbons, carbon monoxide and nitrogen oxides from the first exhaust gas and purify the first exhaust gas;

directly injecting gasoline into the cylinder of the gasoline engine of a fuel-direct-injection type to provide a mixture of air and gasoline having an air-fuel ratio of more than 15 to 50 and combusting the mixture to form an exhaust gas in a second exhaust gas state having an exhaust-gas temperature in a range of 200°C to 500°C at the inlet to the catalyst;

and contacting the exhaust gas in the second exhaust gas state with the catalyst to remove hydrocarbons, carbon monoxide and nitrogen oxides from the second exhaust gas and purify the second exhaust gas.

18. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

the exhaust gas the second exhaust gas state forms a more oxidizing, low-temperature atmosphere as compared with the first exhaust gas state.

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19. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

the first exhaust-gas state is a state at a time of high output of the gasoline engine of a fuel-direct-injection type, and the second exhaust-gas state is a state at a time of low output of the gasoline engine.

20. (canceled)

21. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

the transition metal is at least one selected from the group consisting of manganese, iron, cobalt, copper and nickel.

22. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

the catalyst includes at least one noble metal selected from the group consisting of platinum, rhodium, palladium and iridium.

23. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

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the exhaust-gas temperature in the second exhaust-gas state ranges from 200°C to 350°C at the inlet of the catalyst.

24. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

the catalyst includes platinum and rhodium as the noble metal.

25. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

the catalyst includes at least one of a cerium-oxide powder and a zirconium-oxide powder.

26. (canceled)

27. (canceled)

28. (canceled)

29. (previously presented) The process for purifying exhaust gas from a gasoline engine as defined in claim 17, wherein:

when the temperature of the exhaust gas at the inlet of the catalyst is higher than 500°C, the catalyst is unable to reduce NO_x

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contained in the exhaust gas that is in the second exhaust gas state.

30. (canceled)

31. (canceled)

32. (canceled)